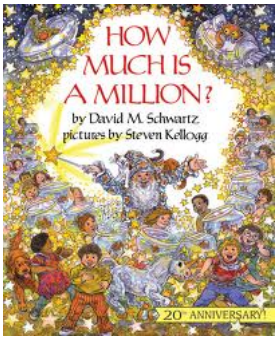
Chapter 9 Exponents & Scientific Notation

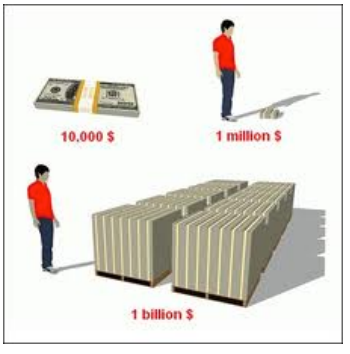
9.6 Writing Scientific Notation

Unit Question: What is the power of powers?

Learner Profile: Reflective

Area of Interaction: Community & Service

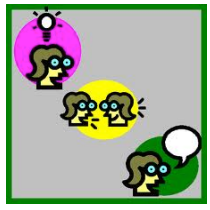




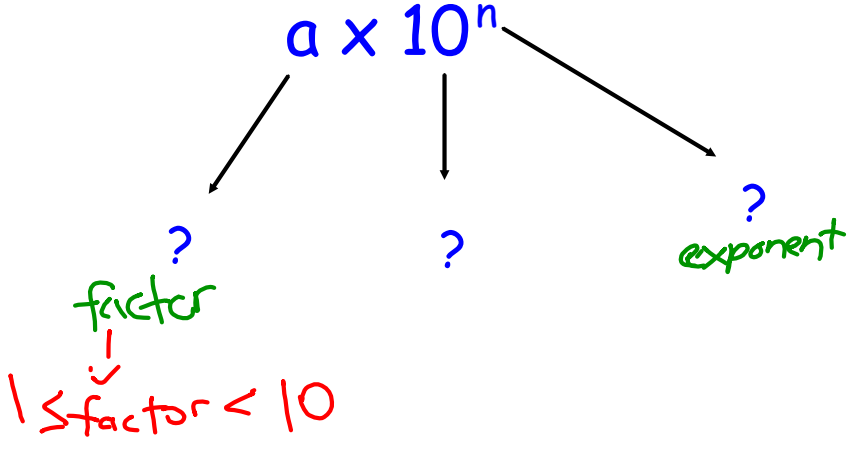
I Can Statement:

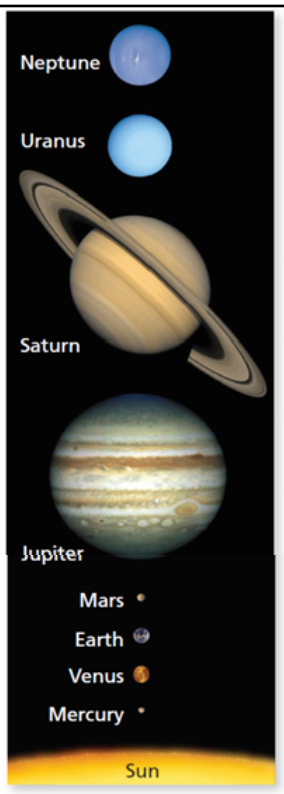
I can use the operations for scientific notation.

Think, Pair, Share



Share with each other what you know about Scientific Notation





Work with a partner. Match each planet with its description. Then write each of the following in scientific notation.

- **Distance from the Sun (in miles)**
- **Distance from the Sun (in feet)**
- **Mass (in kilograms)**

a. Distance: 1,800,000,000 miles
Mass: 87,000,000,000,000,000,000,000,000 kg

b. Distance: 67,000,000 miles
Mass: 4,900,000,000,000,000,000,000,000 kg

c. Distance: 890,000,000 miles
Mass: 570,000,000,000,000,000,000,000,000 kg

d. Distance: 93,000,000 miles
Mass: 6,000,000,000,000,000,000,000,000 kg

e. Distance: 140,000,000 miles
Mass: 640,000,000,000,000,000,000,000 kg

f. Distance: 2,800,000,000 miles
Mass: 100,000,000,000,000,000,000,000,000 kg

g. Distance: 480,000,000 miles
Mass: 1,900,000,000,000,000,000,000,000,000 kg

h. Distance: 36,000,000 miles
Mass: 330,000,000,000,000,000,000,000 kg

Key Idea

Writing Numbers in Scientific Notation

Step 1: Move the decimal point to the right of the first nonzero digit.

Step 2: Count the number of places you moved the decimal point. This determines the exponent of the power of 10.

Number greater than or equal to 10

Use a positive exponent when you move the decimal point to the left.

$$8600 = 8.6 \times 10^{3}$$
3

Number between 0 and 1

Use a negative exponent when you move the decimal point to the right.

$$0.0024 = 2.4 \times 10^{-3}$$
3

EXAMPLE 1 Writing Large Numbers in Scientific Notation

Google purchased YouTube for $1,650,000,000. Write this number in scientific notation.

The number is greater than 1. So, move the decimal point 9 places to the left.

$1,650,000,000 = 1.65 \times 10^{9}$ ← The exponent is positive.

9

50,000: 5×10^{4}

25,000,000 2.5×10^{7}

683 6.83×10^{2}

EXAMPLE 2 Writing Small Numbers in Scientific Notation

The 2004 Indonesian earthquake slowed the rotation of Earth, making the length of a day 0.00000268 second shorter. Write this number in scientific notation.

The number is between 0 and 1. So, move the decimal point 6 places to the right.

$0.00000268 = 2.68 \times 10^{-6}$ ← The exponent is negative.

6

0.005 5×10^{-3}

0.00000033 $3.3 \cdot 10^{-7}$

0.000506 5.06×10^{-4}

When we multiply Scientific Notation, what do you think the steps would be?

$(3 \times 10^{-5}) \times (5 \times 10^{-2})$

$(3 \times 5)\ (10^{-5} \cdot 10^{-2})$

15×10^{-7} 0.000015

Product of Powers

Associative

What rules are we applying?

$(2.5 \times 10^{8}) \times (2 \times 10^{3})$

$(2.5 \times 2)(10^{8} 10^{3})$

5×10^{11}

500,000,000,000

$(5 \times 10^{-4}) \times (5.4 \times 10^{-9})$

$(5 \cdot 5.4)(10^{-4} \cdot 10^{-9})$

$(27)(10^{-13})$

$27 \cdot 10^{-14}$

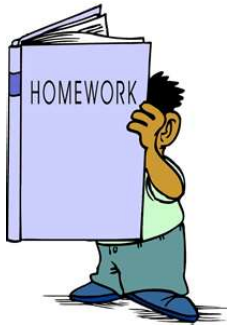
$2.7 \cdot 10^{-14}$

I Can Statement:

I can use the operations for scientific notation.

Assignment:

Book: p.386-387 #6-26.



Radicals Test Reflection